

CPC**COOPERATIVE PATENT CLASSIFICATION****B23D**

PLANING; SLOTTING; SHEARING; BROACHING; SAWING; FILING; SCRAPING; LIKE OPERATIONS FOR WORKING METAL BY REMOVING MATERIAL, NOT OTHERWISE PROVIDED FOR ([making toothed gears or the like B23F](#); [cutting metal by applying heat locally B23K](#); [arrangements for copying or controlling B23Q](#))

Planing; Slotting**B23D 1/00**

Planing or slotting machines cutting by relative movement of the tool and workpiece in a horizontal straight line only

B23D 1/003

- . {for planing elongated workpieces}

B23D 1/006

- .. {Rails}

B23D 1/02

- . by movement of the work-support

B23D 1/04

- .. with the tool supported only on one side of the bed

B23D 1/06

- .. with the tool supported on both sides of the bed

B23D 1/08

- . by movement of the tool

B23D 1/10

- .. with means for adjusting the tool-guide vertically

B23D 1/12

- ... with the tool supported only on one side of the bed

B23D 1/14

- ... with the tool supported on both sides of the bed

B23D 1/16

- .. without means for adjusting the tool-guide vertically

B23D 1/18

- . cutting on both the forward and the return stroke

B23D 1/20

- . with tool-supports or work-supports specially mounted or guided for working in different directions or at different angles; Special purpose machines

B23D 1/205

- .. {Planing nuts, bolt heads or other prismatic workpieces}

B23D 1/22

- .. for planing ingots or the like ([scrubbing or peeling ingots by milling B23C 3/14](#))

B23D 1/24

- .. for planing inner surfaces, e.g. of moulds

B23D 1/26

- .. for planing edges or ridges or cutting grooves ([cutting helical grooves B23D 5/02](#))

B23D 1/28

- .. in which the tool or workpiece is fed otherwise than in a straight line, e.g. for planing profiled stock

B23D 1/30

- ... in which the direction of feed is controlled by a copying device, e.g. by a pattern ([features of copying devices B23Q 35/00](#))

B23D 3/00

Planing or slotting machines cutting by relative movement of the tool and workpiece in a vertical or inclined straight line

B23D 3/02

- . for cutting grooves ([cutting helical grooves B23D 5/02](#))

B23D 3/04

- . in which the tool or workpiece is fed otherwise than in a straight line

B23D 3/06 . . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices [B23Q 35/00](#))

B23D 5/00 Planing or slotting machines cutting otherwise than by relative movement of the tool and workpiece in a straight line

B23D 5/02 . involving rotary and straight-line movements only, e.g. for cutting helical grooves

B23D 5/04 . controlled by a copying device, e.g. by a pattern (features of copying devices [B23Q 35/00](#))

B23D 7/00 Planing or slotting machines characterised only by constructional features of particular parts (constructional features of these parts per se [B23Q](#))

B23D 7/02 . of frames; of work-table beds

B23D 7/04 . of pillars, of cross-beams

B23D 7/06 . of tool-carrying arrangements

B23D 7/08 . of work-tables

B23D 7/10 . of drives for reciprocating parts

B23D 7/105 . . {hydraulically driven}

B23D 7/12 . of arrangements for impact damping or regenerating energy

B23D 9/00 Hand-operated planing devices; Portable planing apparatus

B23D 11/00 Planing or slotting devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool

B23D 13/00 Tools or tool holders specially designed for planing or slotting machines (features applicable also to turning-machines [B23B 27/00](#), [B23B 29/00](#); for cutting gear teeth [B23F 21/04](#))

B23D 13/005 . {Tools or tool holders adapted to operate in both the forward and return stroke}

B23D 13/02 . Pivotaly-mounted holders

B23D 13/04 . Holders for tool sets

B23D 13/06 . Devices for lifting or lowering the tool

Shearing; Similar cutting

B23D 15/00 Shearing machines or shearing devices cutting by blades which move parallel to

themselves

- B23D 15/002 . {for cutting in more than one direction, e.g. angle cutting}
- B23D 15/005 . {for bias cutting of webs or sheets}
- B23D 15/02 . having both upper and lower moving blades
- B23D 15/04 . having only one moving blade
- B23D 15/06 . Sheet shears {([B23D 15/002](#) and [B23D 15/005](#) take precedence)}
- B23D 15/08 . . with a blade moved in one plane, e.g. perpendicular to the surface of the sheet
- B23D 15/10 . . with a blade moved in a curved surface, e.g. for producing an edge with a curved cross-section
- B23D 15/12 . characterised by drives or gearings therefor
- B23D 15/14 . . actuated by fluid or gas pressure
- B23D 15/145 . . . {actuated by explosion}
- B23D 17/00** **Shearing machines or shearing devices cutting by blades pivoted on a single axis** (on an axis parallel to the blade [B23D 15/10](#); hand-held devices [B23D 29/00](#))
- B23D 17/02 . characterised by drives or gearings therefor
- B23D 17/04 . . actuated by a rotary shaft
- B23D 17/06 . . actuated by fluid or gas pressure
- B23D 17/08 . . actuated by hand or foot operated lever mechanism
- B23D 19/00** **Shearing machines or shearing devices cutting by rotary discs** (by friction saw-discs [B23D 45/00](#))
- B23D 19/02 . having both a fixed shearing blade and a rotary shearing disc
- B23D 19/04 . having rotary shearing discs arranged in co-operating pairs
- B23D 19/06 . . with several spaced pairs of shearing discs working simultaneously, e.g. for trimming or making strips
- B23D 19/065 . . . {for cutting along lines not parallel to the longitudinal direction of the material, e.g. oblique or zig-zag cutting}
- B23D 19/08 . for special use, e.g. for cutting curves, for chamfering edges
- B23D 21/00** **Machines or devices for shearing or cutting tubes** (by sawing, see the relevant groups for sawing machines or sawing devices; as additional equipment for deep drawing presses [B21D 24/16](#))
- B23D 21/003 . {by tools working in different directions successively}
- B23D 21/006 . {and sealing, crushing or chamfering the tubes}

- B23D 21/02 . otherwise than in a plane perpendicular to the axis of the tube, e.g. for making mitred cuts, for making bicycle frames
- B23D 21/04 . Tube-severing machines with rotating tool-carrier
- B23D 21/06 . Hand-operated tube-cutters
- B23D 21/08 . . with cutting wheels
- B23D 21/10 . . with other cutting blades or tools
- B23D 21/12 . . . with provision for hammering on the tool
- B23D 21/14 . cutting inside the tube
- B23D 21/145 . . {hand operated}
- B23D 23/00** **Machines or devices for shearing or cutting profiled stock (hand-held devices [B23D 29/00](#))**
- B23D 23/02 . otherwise than in a plane perpendicular to the axis of the stock
- B23D 23/04 . by means of holding-dies, arranged side by side, subjecting the stock to torsional stress
- B23D 25/00** **Machines or arrangements for shearing stock while the latter is travelling otherwise than in the direction of the cut (controlling slack in travelling flexible stock [B21C 47/10](#))**
- B23D 25/02 . Flying shearing machines ([B23D 25/12](#) takes precedence)
- B23D 25/04 . . in which a cutting unit moves bodily with the work while cutting ([B23D 25/06](#) takes precedence)
- B23D 25/06 . . having a cutting device mounted on an oscillating lever
- B23D 25/08 . . having two coacting shearing bladed mounted independently
- B23D 25/10 . . . on co-operating beams moving parallel to each other and attached to lever mechanisms
- B23D 25/12 . shearing machines with blades on coacting rotating drums
- B23D 25/14 . without regard to the exact dimensions of the resulting material, e.g. for cutting-up scrap
- B23D 27/00** **Machines or devices for cutting by a nibbling action**
- B23D 27/02 . Hand-held devices
- B23D 27/04 . . actuated by electric power
- B23D 27/06 . . actuated by fluid or gas pressure
- B23D 29/00** **Hand-held metal-shearing or metal-cutting devices (with nibbling action [B23D 27/02](#); hand-operated devices for metal-cutting otherwise than by shearing [B26B](#))**

- B23D 29/002 . {for cutting wire or the like}
- B23D 29/005 . {for cutting sheets}
- B23D 29/007 . {for splitting nuts (hand operated tools with cutting action actuated by muscle power [B26B 17/003](#))}
- B23D 29/02 . Hand-operated metal-shearing devices
- B23D 29/023 . . { for cutting wires}
- B23D 29/026 . . {for cutting sheets}

- B23D 31/00** **Shearing machines or shearing devices covered by none or more than one of the groups [B23D 15/00](#) to [B23D 29/00](#); Combinations of shearing machines**

- B23D 31/001 . {for trimming deep drawn products (combined with deep-drawing presses [B21D 24/16](#))}
- B23D 31/002 . {Breaking machines, i.e. pre-cutting and subsequent breaking}
- B23D 31/003 . . {for rings}
- B23D 31/008 . {Cutting-up scrap (disintegrating by knives in general [B02C 18/00](#); cutting-up scrap while the material is travelling otherwise than in the direction of the cut [B23D 25/14](#))}
- B23D 31/02 . for performing different cutting operations on travelling stock, e.g. slitting and severing simultaneously
- B23D 31/04 . for trimming stock combined with devices for shredding scrap

- B23D 33/00** **Accessories for shearing machines or shearing devices (feeding stock to machines or removing stock [B21D 43/00](#))**

- B23D 33/003 . {for obtaining pieces of a predetermined weight or volume, e.g. control arrangements ([B23D 36/0025](#) takes precedence)}
- B23D 33/006 . {for obtaining pieces of a predetermined length, e.g. control arrangements ([B23D 36/0033](#) takes precedence)}
- B23D 33/02 . Arrangements for holding, guiding, and/or feeding work during the operation
- B23D 33/025 . . {Guillotines with holding means behind the knives}
- B23D 33/04 . . for making circular cuts
- B23D 33/06 . . in which the direction of feed is controlled by a copying device, e.g. by a pattern (features of copying devices [B23Q 35/00](#))
- B23D 33/08 . Press-pads; Counter-bases; Hold-down devices
- B23D 33/10 . Stop for positioning work
- B23D 33/12 . Equipment for indicating where to cut

- B23D 37/14 . Broaching machines with rotatably-arranged working tools
- B23D 37/16 . . for broaching helical grooves
- B23D 37/18 . Broaching machines with working tools mounted on an endless chain or belt
- B23D 37/20 . Broaching machines with arrangements for working in opposite directions
- B23D 37/22 . for special purposes ([B23D 37/14](#) takes precedence)

B23D 39/00 Accessories for broaching machines or broaching devices

B23D 41/00 Broaching machines or broaching devices characterised only by constructional features of particular parts (constructional features of these parts per se [B23Q](#))

- B23D 41/02 . of frames; of work supports
- B23D 41/04 . of tool-carrying arrangements
- B23D 41/06 . of devices for feeding, clamping, or ejecting workpieces
- B23D 41/08 . of drives; of control devices
- B23D 41/083 . . {Hydraulic drives}
- B23D 41/086 . . {Control devices}

B23D 43/00 Broaching tools (for cutting gear teeth [B23F 21/26](#))

- B23D 43/005 . {for cutting helical grooves}
- B23D 43/02 . for cutting by rectilinear movement ([B23D 43/08](#) takes precedence)
- B23D 43/04 . . having inserted cutting edges
- B23D 43/06 . for cutting by rotational movement
- B23D 43/08 . mounted on an endless chain or belt

Sawing (surgical saws [A61B 17/14](#); sawing wood or similar material [B27B](#); {sawing stone [B28D 1/02](#)})

B23D 45/00 Sawing machines or sawing devices with circular saw blades or with friction saw discs (shearing machines with rotary discs [B23D 19/00](#) to [B23D 25/00](#))

- B23D 45/003 . {for particular purposes}
- B23D 45/006 . {with means to attach the sawing device to the workpiece}
- B23D 45/02 . with a circular saw blade or the stock mounted on a carriage

- B23D 45/021 . . {with the saw blade mounted on a carriage ([B23D 45/06](#), [B23D 45/046](#) take precedence)}
- B23D 45/022 . . . {the carriage performing a vertical movement only}
- B23D 45/024 . . . {the saw blade being adjustable according to depth or angle of cut ([B23D 45/022](#) takes precedence)}
- B23D 45/025 {Radial sawing machines}
- B23D 45/027 . . . {the saw carriage being mounted on a carriage, e.g. gantry-type sawing machines}
- B23D 45/028 . . . {the saw carriage being mounted on a pivoted lever}

- B23D 45/04 . with a circular saw blade or the stock carried by a pivoted lever
- B23D 45/042 . . {with the saw blade carried by a pivoted lever ([B23D 45/028](#), [B23D 45/065](#) take precedence)}
- B23D 45/044 . . . {the saw blade being adjustable according to angle of cut ([B23D 45/025](#) takes precedence)}
- B23D 45/046 . . . {the pivoted lever being mounted on a carriage}
- B23D 45/048 {the saw blade being adjustable according to angle of cut}

- B23D 45/06 . with a circular saw blade arranged underneath a stationary work-table
- B23D 45/061 . . {the saw blade being mounted on a carriage}
- B23D 45/062 . . . {the saw blade being adjustable according to depth or angle of cut}
- B23D 45/063 . . . {the carriage performing a vertical movement only}
- B23D 45/065 . . {with the saw blade carried by a pivoted lever}
- B23D 45/066 . . . {the pivoted lever being mounted on a carriage}
- B23D 45/067 . . . {the saw blade being adjustable according to depth or angle of cut}
- B23D 45/068 . . {the saw blade being adjustable according to depth or angle of cut ([B23D 45/061](#), [B23D 45/065](#) take precedence)}

- B23D 45/08 . with a ring blade having inside saw teeth

- B23D 45/10 . with a plurality of circular saw blades {([B23D 45/143](#), [B23D 45/165](#) take precedence)}
- B23D 45/102 . . {some of which turn about perpendicular axes ([B23D 45/143](#) takes precedence)}
- B23D 45/105 . . {operating within the same plane}
- B23D 45/107 . . {mounted on a turret}

- B23D 45/12 . with a circular saw blade for cutting tubes
- B23D 45/122 . . {for cutting slots in tubes}
- B23D 45/124 . . {the workpieces turning about their longitudinal axis during the cutting operations}
- B23D 45/126 . . {with the tool turning around the workpieces}
- B23D 45/128 . . {with the tool introduced into the tubes and cutting from the inside outwards}

- B23D 45/14 . for cutting otherwise than in a plane perpendicular to the axis of the stock, e.g. for making a mitred cut
- B23D 45/143 . . {with a plurality of circular saw blades}
- B23D 45/146 . . . {the saw blades being angularly fixed}

- B23D 45/16 . Hand-held sawing devices with circular saw blades

- B23D 45/165 .. {with a plurality of saw blades or saw blades having plural cutting zones}
- B23D 45/18 . Machines with circular saw blades for sawing stock while the latter is travelling otherwise than in the direction of the cut ([control of such machines B23D 36/00](#))
- B23D 45/20 .. Flying sawing machines, the saw carrier of which is reciprocated in a guide and moves with the travelling stock during sawing
- B23D 45/22 .. Flying sawing machines with lever-supported saw carrier which moves in a complete circular path
- B23D 45/24 .. Flying sawing machines with lever-supported saw carrier which oscillates in an arc
- B23D 45/26 . with high-speed cutting discs, performing the cut by frictional heat melting the material ([grinders for cutting-off B24B 27/06](#))

- B23D 47/00** **Sawing machines or sawing devices working with circular saw blades, characterised only by constructional features of particular parts** ([constructional features of these parts per se B23Q](#); details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed [B25F 5/00](#))

- B23D 47/005 . {Vibration-damping}
- B23D 47/02 . of frames; of guiding arrangements for work-table or saw-carrier
- B23D 47/025 .. {of tables}
- B23D 47/04 . of devices for feeding, positioning, clamping, or rotating work
- B23D 47/042 .. {for conveying work to, or discharging work from, the machine}
- B23D 47/045 .. {feeding work into engagement with the saw blade}
- B23D 47/047 ... {the work being mounted on rotating work support}
- B23D 47/06 .. for stock of indefinite length
- B23D 47/065 ... {for laterally feeding long workpieces}
- B23D 47/08 . of devices for bringing the circular saw blade to the workpiece or removing same therefrom
- B23D 47/10 .. actuated by fluid or gas pressure
- B23D 47/12 . of drives for circular saw blades
- B23D 47/123 .. {acting on the disc of the saw blade}
- B23D 47/126 .. {Angle drives}

- B23D 49/00** **Machines or devices for sawing with straight reciprocating saw blades, e.g. hacksaws**

- B23D 49/001 . {transportable, e.g. fitted with wheels}
- B23D 49/002 . {with means to attach the sawing device to the work}
- B23D 49/003 . {having a plurality of saw blades or saw blades having plural cutting zones}
- B23D 49/005 .. {with opposed saw blades}
- B23D 49/006 .. {with contiguous, oppositely reciprocating saw blades}

- B23D 49/007 . {Jig saws, i.e. machine saws with a vertically reciprocating narrow saw blade chucked at both ends for contour cutting}
- B23D 49/008 . . {hand-driven or foot-driven}
- B23D 49/02 . Hacksaw machines with straight saw blades secured to a rectilinearly-guided frame, e.g. with the frame fed stepwise in the plane of the guide
- B23D 49/04 . Hacksaw machines with straight saw blades secured to a pivotally-arranged frame
- B23D 49/06 . Hacksaw machines with straight saw blades for special use
- B23D 49/08 . Pad-saw machines, i.e. machines in which the blade is attached to a carrier at one end only
- B23D 49/10 . Hand-held or hand-operated sawing devices with straight saw blades
- B23D 49/105 . . {with means for guiding the sawing device}
- B23D 49/11 . . for special purposes, e.g. offset-blade hand; {Hand saws having spaced blades; Hand saws for sawing grooves or square holes}
- B23D 49/12 . . Hacksaws (B23D 49/11, B23D 49/16 take precedence; bows adjustable in length or height B23D 51/12)
- B23D 49/125 . . . {with wire-type frames}
- B23D 49/14 . . Pad saws {(B23D 49/105, B23D 49/11, B23D 49/16 take precedence)}
- B23D 49/16 . . actuated by electric or magnetic power or prime movers (B23D 49/11 takes precedence)
- B23D 49/162 . . . {Pad sawing devices}
- B23D 49/165 {with means to move the saw blades in an orbital path}
- B23D 49/167 {with means to adjust the guide plate or with means to adjust the plane in which the saw blade moves}

- B23D 51/00** **Sawing machines or sawing devices working with straight blades, characterised only by constructional features of particular parts (constructional features of these parts per se B23Q; details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00); Carrying or attaching means for tools, covered by this subclass, which are connected to a carrier at both ends**
- B23D 51/005 . {Devices for moving the tool to the workpiece}
- B23D 51/01 . characterised by the handle
- B23D 51/02 . of beds; of guiding arrangements for work-tables or saw carriers; of frames
- B23D 51/025 . . {of arrangements for guiding the saw blade}
- B23D 51/03 . . with extensible or collapsible frames; {Frames with spare blade storage means}
- B23D 51/04 . of devices for feeding, positioning, clamping, or rotating work
- B23D 51/043 . . {for conveying work to, or discharging work from, the machine}
- B23D 51/046 . . {for feeding work into engagement with the saw blade, e.g. rotating work while sawing}

- B23D 51/06 . . . for stock of indefinite length
- B23D 51/065 . . . {for laterally feeding long workpieces}

- B23D 51/08 . . . of devices for mounting straight saw blades or other tools
- B23D 51/10 . . . for hand-held or hand-operated devices
- B23D 51/12 . . . for use with tools, dealt with in this subclass, which are connected to a carrier at both ends, e.g. bows adjustable in length or height
- B23D 51/125 . . . {Blade tensioning means}
- B23D 51/14 . . . Attachment of the tool

- B23D 51/16 . . . of drives or feed mechanisms for straight tools, e.g. saw blades, or bows
- B23D 51/163 . . . {Vibratory electromagnetic drives therefor}
- B23D 51/166 . . . {Devices for arresting movement of the saw blades ([B23D 51/20](#) takes precedence)}
- B23D 51/18 . . . actuated by fluid or gas pressure ([B23D 51/20](#) takes precedence)
- B23D 51/20 . . . with controlled feed of the tool, or with special arrangements for relieving or lifting the tool on the return stroke

- B23D 53/00 **Machines or devices for sawing with strap saw-blades which are effectively endless in use, e.g. for contour cutting****

- B23D 53/001 . . . {transportable, e.g. fitted with wheels}
- B23D 53/003 . . . {with means to attach the sawing device to the workpiece}
- B23D 53/005 . . . {with a plurality of band saw blades or band saw blades having plural cutting zones, e.g. contiguous oppositely-moving saw blade portions ([for length cutting of trunks B27B 15/08](#))}
- B23D 53/006 . . . {Convertible sawing devices}
- B23D 53/008 . . . {Open-end band saws}
- B23D 53/02 . . . with stationarily-mounted wheels, {i.e. during sawing} carrying the strap ([B23D 53/06](#) takes precedence)
- B23D 53/023 . . . {Arrangements for tilting the head carrying the saw wheels}
- B23D 53/026 . . . {the band saw blade being guided in a horizontal plane}
- B23D 53/04 . . . with the wheels carrying the strap mounted shiftably or swingingly, {i.e. during sawing}, other than merely for adjustment
- B23D 53/045 . . . {with pivotedly mounted head carrying the saw wheels}
- B23D 53/06 . . . with shiftable or swinging work-table
- B23D 53/08 . . . for cutting profiled stock
- B23D 53/10 . . . Sawing devices working with strap saw-blades able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool

- B23D 53/12 . Hand-held or hand-operated sawing devices working with strap saw blades

- B23D 55/00** **Sawing machines or sawing devices working with strap saw blades, characterised only by constructional features of particular parts (constructional features of these parts per se [B23Q](#))**

- B23D 55/005 . {Devices for damping vibrations}

- B23D 55/02 . of frames; of tables
- B23D 55/023 .. {of tables ([B23D 53/06](#) takes precedence)}
- B23D 55/026 ... {the table being adjustable according to depth or angle of cut}

- B23D 55/04 . of devices for feeding or clamping work
- B23D 55/043 .. {for conveying work to the sawing machine}
- B23D 55/046 .. {for feeding work into engagement with the saw blade ([B23D 53/06](#) takes precedence)}

- B23D 55/06 . of drives for strap saw blades; of wheel mountings
- B23D 55/065 .. {of wheels}

- B23D 55/08 . of devices for guiding or feeding strap saw blades
- B23D 55/082 .. {Devices for guiding strap saw blades}
- B23D 55/084 ... {which automatically detect or correct band saw blade deflection}
- B23D 55/086 ... {with means for automatically adjusting the distance between the guides}
- B23D 55/088 .. {Devices for feeding strap saw blades}

- B23D 55/10 . of devices for tensioning strap saw blades ([B23D 55/06](#) takes precedence; incorporated in the strap [B23D 61/12](#))

- B23D 57/00** **Sawing machines or sawing devices not covered by one of the preceding groups [B23D 45/00](#) to [B23D 55/00](#)**

- B23D 57/0007 . {using saw wires}
- B23D 57/0015 .. {hand-held or hand-operated}
- B23D 57/0023 .. {with a plurality of saw wires or saw wires having plural cutting zones}

- B23D 57/003 . {Sawing machines or sawing devices working with saw wires, characterised only by constructional features of particular parts (constructional features of these parts per se [B23Q](#))}
- B23D 57/0038 .. {of frames; of tables}
- B23D 57/0046 .. {of devices for feeding, conveying or clamping work}
- B23D 57/0053 .. {of drives for saw wires; of wheel mountings; of wheels}
- B23D 57/0061 .. {of devices for guiding or feeding saw wires}
- B23D 57/0069 .. {of devices for tensioning saw wires}

- B23D 57/0076 . {Devices for converting any machine for sawing purposes}

- B23D 57/0084 . {specially adapted for sawing under water or at places accessible with difficulty}
- B23D 57/0092 . {dismountable, collapsible or transportable, e.g. by means of a carrying case}
- B23D 57/02 . with chain saws
- B23D 57/023 .. {hand-held or hand-operated}
- B23D 57/026 .. {with a plurality of saw chains}

- B23D 59/00** **Accessories specially designed for sawing machines or sawing devices (lubricating or cooling machine tools in general [B23Q 11/12](#))**

- B23D 59/001 . {Measuring or control devices, e.g. for automatic control of work feed pressure on band saw blade (measuring in general [G01](#); controlling in general [G05](#))}
- B23D 59/002 .. {for the position of the saw blade ([B27B 5/36](#) and [B27B 9/02](#) take precedence)}
- B23D 59/003 ... { Indicating the cutting plane on the workpiece, e.g. by projecting a laser beam}
- B23D 59/005 .. {for preventing collision of saw blades with other machine parts or workpieces}

- B23D 59/006 . {for removing or collecting chips}
- B23D 59/007 . {for mounting a portable sawing device on a frame part}
- B23D 59/008 . {comprising computers}

- B23D 59/02 . Devices for lubricating or cooling circular saw blades
- B23D 59/025 .. {the lubricating or cooling medium being applied through the mounting means of the tool, e.g. the tool spindle or hub}

- B23D 59/04 . Devices for lubricating or cooling straight or strap saw blades

- B23D 61/00** **Tools for sawing machines or sawing devices (tools for trepanning [B23B 51/04](#)); Clamping devices for these tools**

- B23D 61/003 . {Rotary saws comprising an essentially cylindrical body having cutting teeth arranged on its surface}

- B23D 61/006 . { Oscillating saw blades}

- B23D 61/02 . Circular saw blades
- B23D 61/021 .. {Types of set; Variable teeth, e.g. variable in height or gullet depth: Varying pitch; Details of gullet}
- B23D 61/023 .. {with inserted segments having more than one tooth}
- B23D 61/025 .. {Details of saw blade body}
- B23D 61/026 ... {Composite body, e.g. laminated, body of diverse material}
- B23D 61/028 .. {of special material}
- B23D 61/04 .. with inserted saw teeth {the teeth being individually inserted}
- B23D 61/06 ... in exchangeable arrangement
- B23D 61/065 {Adjustable teeth}

- B23D 61/08 . . . Ring saw blades with internal saw teeth
- B23D 61/10 . . . clamped between hubs; Clamping or aligning devices therefor
- B23D 61/12 . . . Straight saw blades; Strap saw blades
- B23D 61/121 . . . {Types of set; Variable teeth, e.g. variable in height or gullet depth; Varying pitch; Details of gullet}
- B23D 61/122 . . . {with inserted segments having more than one tooth}
- B23D 61/123 . . . {Details of saw blade body}
- B23D 61/125 {Composite body, e.g. laminated, body of diverse material}
- B23D 61/126 . . . {having cutting teeth along both edges}
- B23D 61/127 . . . {of special material}
- B23D 61/128 . . . {Sabre saw blades}
- B23D 61/14 . . . with inserted saw teeth, {i.e. the teeth being individually inserted}
- B23D 61/16 in exchangeable arrangement
- B23D 61/18 . . . Sawing tools of special type, e.g. wire saw strands, saw blades or saw wire equipped with diamonds or other abrasive particles in selected individual positions {(cut-off wheels of bonded abrasive or with inserted abrasive blocks [B24D 5/12](#))}
- B23D 61/185 . . . {Saw wires; Saw cables; Twisted saw strips}
- B23D 63/00** **Dressing the tools of sawing machines or sawing devices for use in cutting any kind of material, e.g. in the manufacture of sawing tools**
- B23D 63/001 . . . {Devices for positioning the dressing tool with respect to the saw blade}
- B23D 63/003 . . . {Saw clamping devices}
- B23D 63/005 . . . {Workpiece indexing equipment specially adapted to form part of sawing tool dressing machines}
- B23D 63/006 . . . {Saw teeth setting devices working with setting rollers}
- B23D 63/008 . . . {using computer control means}
- B23D 63/02 . . . Setting saw teeth by means of hand-operated {or foot-operated} devices {([B23D 63/006](#) takes precedence)}
- B23D 63/023 {Devices of the portable type carried by one hand and operable by one hand or two hands, e.g. having a pair of tongs}
- B23D 63/026 {Foot-operated devices}
- B23D 63/04 . . . Setting saw teeth of circular, straight, or strap saw blades by means of power-operated devices {([B23D 63/006](#) takes precedence)}
- B23D 63/06 . . . Upsetting the cutting edges of saw teeth, e.g. swaging
- B23D 63/08 . . . Sharpening the cutting edges or saw teeth
- B23D 63/10 by filing
- B23D 63/105 {sharpening circular saw blades}

- B23D 63/12 . . . by grinding
- B23D 63/123 . . . {using two or more grinding wheels simultaneously}
- B23D 63/126 . . . {the tool being a grinding worm}
- B23D 63/14 . . . Sharpening circular saw blades
- B23D 63/16 . . . of chain saws (of mortise chain cutters [B24B 3/14](#))
- B23D 63/162 . . . {by a reciprocating or rotating rod-like sharpening tool, e.g. file, grinding cylinder}
- B23D 63/164 . . . {with tools that remain stationarily positioned during sharpening}
- B23D 63/166 . . . {without removal of the saw chain from the guide bar ([B23D 63/162](#) takes precedence)}
- B23D 63/168 {the saw chain moving around the guide bar}

- B23D 63/18 . . . Straightening damaged saw blades; Reconditioning the side surface of saw blades, e.g. by grinding

- B23D 63/20 . . . Combined processes for dressing saw teeth, e.g. both hardening and setting
- B23D 63/201 . . . {Combined setting and grinding}
- B23D 63/203 . . . {Combined setting and filing}
- B23D 63/205 . . . {Combined setting and upsetting}
- B23D 63/206 . . . {Combined upsetting and grinding}
- B23D 63/208 . . . {Combined upsetting and filing}

- B23D 65/00** **Making tools for sawing machines or sawing devices for use in cutting any kind of material**

- B23D 65/02 . . . Making saw teeth by punching, cutting, or planing
- B23D 65/04 . . . Making saw teeth by milling

- Filing or rasping** ([sharpening saw teeth thereby B23D 63/10](#))

- B23D 67/00** **Filing or rasping machines of devices** ([securing arrangements for files or rasps B23D 71/00](#))

- B23D 67/02 . . . with reciprocating tools, mounted in a yoke or the like
- B23D 67/04 . . . with reciprocating tools, attached to a carrier at one end only
- B23D 67/06 . . . with rotating tools
- B23D 67/08 . . . with tools mounded on an endless chain or belt
- B23D 67/10 . . . for special use, e.g. for filing keys; Accessories therefor
- B23D 67/12 . . . Hand-held or hand-operated filing or rasping devices ([hand files or rasps B23D 71/04](#))

- B23D 69/00** **Filing or rasping machines or devices. characterised only by constructional features of particular parts, e.g. guiding arrangements, drives** ([constructional features of these parts per se B23Q](#)); **Accessories for filing or rasping** ([attached to the tool B23D 71/10](#))
- B23D 69/02 . Guiding arrangements for hand tools
- B23D 71/00** **Filing or rasping tools; Securing arrangements therefor** (tool holders for machine tools [B23Q 3/00](#); handles for hand implements [B25G](#))
- B23D 71/005 . {Rotary files}
- B23D 71/02 . for filing or rasping machines or devices
- B23D 71/025 .. {for rubber-like material}
- B23D 71/04 . Hand files or hand rasps ([carrying or attaching means for tools which are connected to a carrier at both ends B23D 51/12](#); [guiding arrangements B23D 69/02](#))
- B23D 71/06 .. using a single interchangeable blade
- B23D 71/08 .. using a plurality of interchangeable cutting elements
- B23D 71/10 . Accessories for filing or rasping tools, e.g. for preventing scoring of workpieces by the edges of the tool
- B23D 73/00** **Making files or rasps**
- B23D 73/02 . Preliminary treatment of blanks, e.g. grinding, polishing, specially adapted for the manufacture of files or rasps
- B23D 73/04 . Methods or machines for the manufacture of files or rasps ([non-mechanical methods, see the relevant classes](#))
- B23D 73/06 .. Cutting the working surfaces by means of chisels
- B23D 73/08 .. Milling, planing, slotting, knurling, or broaching the working surfaces
- B23D 73/10 .. Grinding the working surfaces
- B23D 73/12 .. Peculiar procedures for sharpening or otherwise treating the working surfaces ([special treatment by sand-blast B24C 1/02](#); [sharpening files by etching C23F 1/06](#))
- B23D 73/14 . Tools or accessories specially adapted for making files or rasps, e.g. chisels, supporting-frames
- Reaming bored holes**
- B23D 75/00** **Reaming machines or reaming devices** (tool holders for machine tools [B23Q 3/00](#); handles for hand implements [B25G](#))
- B23D 75/005 . {Hand-held or hand-operated reaming devices}

B23D 77/00**Reaming tools**

- B23D 77/003 . {with means for preventing chatter}
- B23D 77/006 . {with means for lubricating or cooling}
- B23D 77/02 . Reamers with inserted cutting edges
- B23D 77/025 .. {Securing arrangements for cutting inserts}
- B23D 77/04 .. with cutting edges adjustable to different diameters along the whole cutting length
- B23D 77/042 ... {by means of oblique planes}
- B23D 77/044 ... {by means of screws}
- B23D 77/046 ... {by means of radial cams}
- B23D 77/048 ... {by means of conical screw threads}
- B23D 77/06 . Reaming with means for compensating wear ([B23D 77/04](#) takes precedence)
- B23D 77/08 .. by spreading slotted parts of the tool body
- B23D 77/10 .. by expanding a tube-like non-slotted part of the tool body
- B23D 77/12 . Reamers with cutting edges arranged in tapered form
- B23D 77/14 . Reamers for special use, e.g. for working cylinder ridges

B23D 79/00**Methods, machines, or devices not covered elsewhere, for working metal by removal of material** (by combined operations [81/00](#); cutting by electron-beam [B23K 15/00](#), by laser beam [B23K 26/00](#); by electro-erosion [B23H](#); tool holders for machine tools [B23Q 3/00](#); handles for hand implements [B25G](#))

- B23D 79/005 . {for thermal deburring ([B23D 79/025](#) takes precedence)}
- B23D 79/02 . Machines or devices for scraping ([turning-machines](#) for bevelling, chamfering, or deburring the ends of bars or tubes [B23B 5/16](#))
- B23D 79/021 .. {for removing welding, brazing or soldering burrs, e.g. flash, on pipes or rods}
- B23D 79/023 ... {internally}
- B23D 79/025 {including other than cutting means, e.g. hot gas}
- B23D 79/026 .. {for removing welding flashes on rails}
- B23D 79/028 .. {for removing welding flashes on chain links}
- B23D 79/04 .. with rotating cutting-tool, e.g. for smoothing linings of bearings
- B23D 79/06 .. with reciprocating cutting-tool
- B23D 79/08 .. Hand scraping-implements
- B23D 79/10 .. Accessories for holding scraping tools or work to be scraped
- B23D 79/12 . Machines or devices for peeling bars or tubes making use of cutting bits arranged around the workpiece, otherwise than by turning ([by turning](#) [B23B 5/12](#))

B23D 81/00**Methods, machines, or devices for working metal, covered by more than one main**

group in this subclass (in combination with other metal-working operations [B23P 13/00](#), [B23D 23/00](#))

- B23D 2015/00** **Shearing machines or shearing devices cutting by blades which move parallel to themselves**
- [B23D 2015/007](#) . reciprocating horizontally
- B23D 2023/00** **Machines or devices for shearing or cutting profiled stock** ([hand-held devices B23D 29/00](#))
- [B23D 2023/005](#) . for window coverings
- B23D 2031/00** **Shearing machines or shearing devices covered by none or more than one of the groups [B23D 15/00](#) to [B23D 29/00](#); Combinations of shearing machines**
- [B23D 2031/002](#) . {[Breaking machines, i.e. pre-cutting and subsequent breaking](#)}
- [B23D 2031/003](#) .. {[for rings](#)}
- [B23D 2031/005](#) ... Cap holders therefor
- [B23D 2031/006](#) ... for gangs
- [B23D 2031/007](#) .. for journals
- B23D 2043/00** **Broaching tools** ([for cutting gear teeth B23F 21/26](#))
- [B23D 2043/02](#) . for cutting by rectilinear movement ([B23D 43/08 takes precedence](#))
- [B23D 2043/025](#) .. for producing grooves in turbines, e.g. for the insertion of blades
- [B23D 2043/06](#) . for cutting by rotational movement
- [B23D 2043/063](#) .. with cutters mounted externally
- [B23D 2043/066](#) .. with cutters mounted internally
- B23D 2277/00** **Reaming tools**
- [B23D 2277/02](#) . Cutting head and shank made from two different components which are releasably or non-releasably attached to each other
- [B23D 2277/04](#) . Cutting angles
- [B23D 2277/06](#) . Connections between component parts
- [B23D 2277/061](#) .. Brazed connections
- [B23D 2277/062](#) .. Clamping the cutting insert or cutting bit by means of plastic deformation

- B23D 2277/063 .. Clamping the cutting insert or cutting bit using an elastically deformable clamping member
- B23D 2277/064 .. using a specially shaped fixation hole in the cutting insert or cutting bit
- B23D 2277/065 .. Glued connections
- B23D 2277/066 .. using a hollow screw, e.g. for the transmission of coolant
- B23D 2277/067 .. using heating and cooling, i.e. heat shrinking
- B23D 2277/068 .. using a groove in the top face of the cutting insert or bit engaged by a clamp

- B23D 2277/08 . Adjustment mechanisms
 - B23D 2277/081 .. for axial adjustment of the cutting edge, cutting insert or cutting bit
 - B23D 2277/083 .. with means to prevent the user accessing the adjusting mechanism
 - B23D 2277/085 .. comprising hydraulics
 - B23D 2277/086 .. comprising gears
 - B23D 2277/088 .. with an adjustment screw of special form

- B23D 2277/10 . comprising means for damping of vibration, i.e. for reduction of chatter
 - B23D 2277/105 .. with cutting edges located at unequal angles around the periphery of the tool

- B23D 2277/12 . comprising balls

- B23D 2277/14 . Means for burnishing

- B23D 2277/16 . Use of centrifugal force to activate cutting means

- B23D 2277/20 . Number of cutting edges
 - B23D 2277/201 .. One
 - B23D 2277/202 .. Two
 - B23D 2277/203 .. Four
 - B23D 2277/204 .. Five
 - B23D 2277/205 .. Six
 - B23D 2277/206 .. Eight
 - B23D 2277/207 .. Nine
 - B23D 2277/208 .. Ten

- B23D 2277/24 . Materials of the tool or the intended workpiece, methods of applying these materials
 - B23D 2277/2407 .. Applied by chemical vapour deposition (CVD) processes ([coating by chemical vapour deposition in general C23C 16/00](#))
 - B23D 2277/2414 .. Applied by physical vapour deposition (PVD) processes ([coating by physical vapour deposition in general C23C 14/00](#))
 - B23D 2277/2421 .. Aluminium
 - B23D 2277/2428 .. Ceramics, e.g. aluminium oxide or silicone nitride
 - B23D 2277/2435 .. Cubic boron nitride (CBN)
 - B23D 2277/2442 .. Diamond
 - B23D 2277/245 ... polycrystalline (PCD)
 - B23D 2277/2457 .. Elastomers, e.g. rubber

- B23D 2277/2464 . . Hard metal, i.e. cemented carbide
- B23D 2277/2471 . . Steel
- B23D 2277/2478 . . . high speed steel
- B23D 2277/2485 . . Titanium nitride
- B23D 2277/2492 . . Titanium carbide

- B23D 2277/26 . Means for breaking chips

- B23D 2277/28 . Chip collectors

- B23D 2277/30 . Chip guiding means

- B23D 2277/32 . Details of the region preceding the axial cutting edge in the direction of feed
- B23D 2277/34 . comprising cutting inserts made from different materials
- B23D 2277/36 . with the diameter of the tool decreasing in the direction of the shank from the cutting tip
- B23D 2277/38 . comprising eccentrics
- B23D 2277/40 . configured to ream an external surface
- B23D 2277/42 . comprising floating cutting heads
- B23D 2277/44 . comprising chip grooves, i.e. flutes, of special form
- B23D 2277/46 . Guiding pads
- B23D 2277/48 . Guiding rollers
- B23D 2277/50 . configured as a hand tool
- B23D 2277/52 . Details of helices, e.g. helix angles or helices of special form
- B23D 2277/54 . comprising cutting inserts inclined in the axial plane
- B23D 2277/56 . comprising an indication scale
- B23D 2277/58 . Keys, e.g. spanners or allen keys, for assembling or disassembling the reaming tool
- B23D 2277/60 . comprising means for lubrication or cooling
- B23D 2277/62 . Margins, i.e. the area on the circumference of the tool immediately behind the axial cutting edge
- B23D 2277/64 . Markings, letters or numbers
- B23D 2277/66 . Measurement of the tool or bore
- B23D 2277/68 . Pilots

- B23D 2277/70 . Polygonal sections, e.g. for torque transmission between parts able to be uncoupled
- B23D 2277/72 . comprising a body having a special profile, i.e. having an special cross section
- B23D 2277/74 . comprising serrations
- B23D 2277/76 . Shims
- B23D 2277/78 . for use with holes associated with spark plugs or glow plugs
- B23D 2277/80 . comprising a spring
- B23D 2277/82 . for producing a stepped bore
- B23D 2277/84 . with tangentially mounted cutting inserts
- B23D 2277/86 . comprising a thread